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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,210	10/10/2003	Susumu Suzuki	16869K-096700US	2890

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EXAMINER	
RUTZ, JARED IAN	
ART UNIT	**PAPER NUMBER**
2187	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/684,210	**Applicant(s)** SUZUKI ET AL.
	Examiner Jared I. Rutz	**Art Unit** 2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8222005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 13-26, as amended on 5/16/2005 are pending in the present application, claims 1-12 having been cancelled on 1/27/2005. Of the pending claims, there are 4 independent claims and 10 dependent claims.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 10/10/2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

2. The information disclosure statement (IDS) submitted on 10/18/2004 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

3. The information disclosure statement (IDS) submitted on 6/13/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 14, 18, and 22** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

4. **Claims 14 and 18** recite the limitation "in order". It is not clear from the specification what order the relationships would need to be split to occur "in order". As the meaning of this limitation is not clear from the specification, one of ordinary skill in the art would not be able to make and/or use the claimed invention without undue experimentation. For the purpose of this examination, the limitation "in order" will be interpreted as being the order in which the splits are performed.

5. **Claim 18** additionally recites the limitation "the controller splits a relationship between the first storage region and the second storage region faster than a relationship between a third storage region of the first plurality of storage regions and a fourth storage region of the second plurality of storage regions in accordance with receiving the write command." There is no discussion in the specification of one pair of storage regions requiring less time to be split than another pair of storage regions. As the meaning of this limitation is not clear from the specification, one of ordinary skill in the art would be unable to make or use the invention as claimed without undue experimentation. For the purpose of this examination, said limitation will be interpreted

as "the controller splits a relationship between the first storage region and the second storage region and a relationship between a third storage region of the first plurality of storage regions and a fourth storage region of the second plurality of storage regions in accordance with receiving the write command."

6. **Claim 18** additionally recites the limitation "The controller splits a relationship between the first storage region and the second storage region faster than a relationship between a third storage region of the first plurality of storage regions and a fourth storage region of the second plurality of storage regions in accordance with receiving the write command, the relationship between the first storage region and the second storage region and the relationship between the third storage region and the fourth storage region being not split in case of receiving the write command." It is not clear how the relationships between the storage regions can be split in accordance with receiving the write command and not be split in case of receiving the write command. . As the meaning of this limitation is not clear from the specification, one of ordinary skill in the art would be unable to make or use the invention as claimed without undue experimentation.

7. **Claim 22** recites the limitation "And a relationship between the third plurality of storage regions and a fourth plurality of storage regions related to a third group is split based on another split command." The third and fourth storage regions are described as belonging to a second group in the second line of the claim. The ability for a plurality of storage regions to be members of more than one consistency group is not taught by the specification. As what it means for a plurality of storage units to be members of

more than one consistency group is not taught, one of ordinary skill in the art would be unable to make or use the invention as claimed without undue experimentation. For the purpose of this examination, the limitation will be interpreted as "And a relationship between the third plurality of storage regions and a fourth plurality of storage regions related to a second group is split based on another split command."

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. **Claims 13, 14, 18, and 21-22** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. **Claim 13** Lines 3-4 recites the limitation "a plurality of storage regions which include a first group having a first plurality of storage regions and a second plurality of storage regions." It is unclear if the first group contains both the first plurality and second plurality of storage regions, or if the plurality of storage regions includes a first group and a second plurality of storage regions, the first group having a first plurality of storage regions. For the purpose of this examination, it will be interpreted that the first group contains both the first plurality and second plurality of storage regions.

11. As discussed supra, **claims 14, 18 and 22** contain limitations that are not clear from the claims or the specification. As such, the metes and bounds of these claims are not clearly defined.

12. **Claim 21** reads "Wherein the relationship between the first plurality of storage regions and the second plurality of storage regions is split and consistency among data stored in the first plurality of storage regions is maintained and consistency among data stored in the second plurality of storage regions is maintained." It is unclear what the data in the first storage region and the data in the second storage region is kept consistent with. From the specification, splitting the relationship between the storage regions means that the data consistency is not maintained between the primary and secondary volumes. What is the data maintained consistent with respect to? For the purpose of this examination, it will be interpreted that the consistency of data in the first plurality of storage regions will be maintained with respect to the current time, and the consistency of the data in the second plurality of storage units will be maintained with respect to the point in time that the split command was issued.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. **Claims 13-26** are rejected under 35 U.S.C. 102(e) as being anticipated by Cabrera et al (US 6,708,227).

15. **Claim 13** is taught by Cabrera as:

a. A storage system, comprising: a plurality of storage regions which include a first group having a first plurality of storage regions and a second plurality of storage regions. See figure 5, which shows multiple storage regions O1 to On, discussed in column 5 lines 55-57. See also column 2 lines 26-30, which show that when a write is made to an allocation unit that is part of a snapshot, the original data is copied to a differential file. The volumes that are part of the snapshot correspond to the first storage regions, and the differential files correspond to the second storage regions. Column 9 lines 48-52 show that multiple volumes can be combined to form a snapshot set, which corresponds to the first group.

b. A plurality of disk drive units having a plurality of disk drives which include the plurality of storage regions. Column 3 lines 47-49 show that the invention acts to coordinate/manage multiple different volume snapshot providers. In the context of the reference, this shows that multiple different storage devices, each containing one or more disk drives as known to one of ordinary skill in the art, can be used together and treated as a single storage and snapshot system. See column 3 lines 1-38 for an explanation.

c. A controller configured to be coupled to an information processing device and to transfer data sent from the information processing device to the plurality of storage regions. See the Volume Snapshot Service Coordinator described in column 4 lines 37-42. The VSSC provides a consistent API to allow a host computer to interface with a plurality of storage devices.

d. Wherein the controller is configured to receive a split command sent to the first group. The split command as taught by page 12 lines 12-27 of the instant application is equivalent to taking a snapshot in that the second volume will contain only the data present in the second volume at the time of the split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. Therefore, it is inherent that the VSSC is configured to receive the split command sent to the first group.

e. Start, in accordance with the split command, changing from a first status to a second status in which a relationship between the first plurality of storage regions and the second plurality of storage regions related to the first group is split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. This means that the storage regions in the group change from a first status, in which all writes to the first plurality are written to the second plurality, to a second status, in which no writes are made to the second plurality.

f. Receive a write command sent from the information processing device to a first storage region of the first plurality of storage regions during a period of changing from the first status to the second status. Column 2 lines 41-42 incorporates by reference US patent application 09/505,450, now US patent 6,473,775 to Kusters et al. Kusters is provided as background information relating to snapshot services related to the disclosed invention of Cabrera.

Cabrera discloses via Kusters column 1 lines 61-64 that a snapshot with a differential file can be created without suspending writes. Therefore, it is inherent that the controller is configured to receive a write command while changing from the first status to the second.

g. Complete changing from the first status to the second status after writing data related to the write command to the first storage region. Kusters column 1 lines 22-30 shows that the snapshot system is a copy on write (see figure 6), which saves a snapshot as a point in time copy of the first volume.

h. And wherein consistency of data stored in the second plurality of storage regions in the second status is maintained. Kusters column 1 lines 13-16 show that a snapshot is a copy of the data in a volume at a point in time. Column 1 lines 22-26 shows the copy-on-write method used to ensure data in the first volume is copied to the second volume to manage the snapshot at a point in time.

16. **Claim 14** is taught by Cabrera as:

i. Wherein the controller splits in order each relationship between each of the first plurality of storage regions and each of the second plurality of storage regions during changing from the first status to the second status. For the purpose of this examination, the limitation "in order" will be interpreted as being the order in which the splits are performed. Column 9 lines 48-52 shows that all the snapshots in the set relate to the same point in time. Therefore, the relationship between each of the first plurality of storage regions and their corresponding second volumes is split in an order to change from the first status to the second status.

17. **Claim 15** is taught by Cabrera as:

j. Wherein, in accordance with receiving the write command, the controller checks whether a relationship between the first storage region and the second storage is split. Kusters column 8 line 65 to column 9 line 2 shows that the controller checks to see if the data being written is of interest, i.e., if it is a new write to a volume that is part of a snapshot.

18. **Claim 16** is taught by Cabrera as:

k. Wherein the controller is able to copy data stored in the first storage region in case of receiving the write command and not splitting a relationship between the first storage region and the second storage region. Column 8 lines 17-20 show that the invention disclosed by Cabrera may use a split-mirror technique for snapshots. A split-mirror technique keeps the first and second volumes synchronized by copying all writes to the first volume to the second volume until the two volumes are split to form a full snapshot.

19. **Claim 17** is taught by Cabrera as:

l. Wherein the controller is not able to copy data stored in the first storage region to the second storage region in case of receiving the write command and splitting a relationship between the first storage region and the second storage region. Column 8 lines 17-20 show that the invention disclosed by Cabrera may use a split-mirror technique for snapshots. A split-mirror technique keeps the first and second volumes synchronized by copying all writes to the first volume to the second volume until the two volumes are split to form a full snapshot. When the volumes are split, the controller is unable to copy data from the first volume to the second volume.

20. **Claim 18** is taught by Cabrera as:

m. The controller splits in order each relationship between each of the first plurality and each of the second plurality of storage regions during changing from the first status to the second status. For the purpose of this examination, the limitation "in order" will be interpreted as being the order in which the splits are performed. Column 9 lines 48-52 shows that all the snapshots in the set relate to the same point in time. Therefore, the relationship between each of the first plurality of storage regions and their corresponding second volumes is split in an order to change from the first status to the second status.

n. The controller splits a relationship between the first storage region and the second storage region faster than a relationship between a third storage region of the first plurality of storage regions and a fourth storage region of the second plurality of storage regions in accordance with receiving the write command, the relationship between the first storage region and the second storage region and the relationship between the third storage region and the fourth storage region being not split in case of receiving the write command. The amount of time required to split a storage region depends on the size of the storage region. A first and second storage region that is smaller than a third and fourth storage would be split faster than the third and fourth regions.

21. **Claim 19** is taught by Cabrera as:

o. Wherein the controller receives a write command or a read command sent to the second storage region. Column lines 30-35 shows that the snapshot is accessible, i.e., it can be read from and written to.

22. **Claim 20** is taught by Cabrera as:

p. Wherein the first status is a pair status in which data stored in the first plurality of storage regions are updated to the second plurality of storage regions. Column 8 lines 17-20 show that the invention disclosed by Cabrera may use a split-mirror technique for snapshots. A split-mirror technique keeps the first and second volumes synchronized by copying all writes to the first volume to the second volume until the two volumes are split to form a full snapshot.

23. **Claim 21** is taught by Cabrera as:

q. Wherein the relationship between the first plurality of storage regions and the second plurality of storage regions is split and consistency among data stored in the first plurality of storage regions is maintained and consistency among data stored in the second plurality of storage regions is maintained. For the purpose of this examination, it will be interpreted that the consistency first plurality of storage regions will be maintained with respect to the current time, and the second plurality of storage units will be maintained with respect to the point in time that the split command was issued. Column 2 lines 30-35 show that the state of the first volume at the time the snapshot is taken is accessible; therefore it is maintained with respect to the point in time that the split command was issued. Column 1 lines 22-26 shows the copy-on-write method used to ensure data in the first volume is copied to the second volume when it is updated to manage the snapshot at a point in time. This shows that the first volume is written to, and thus maintained with respect to the current time.

24. **Claim 22** is taught by Cabrera as:

r. Wherein the plurality of storage regions include a second group having a third plurality of storage regions and a fourth plurality of storage regions. Figure 6 shows multiple snapshot sets as explained in column 8 line 66 to column 9 line 10.

s. And a relationship between the third plurality of storage regions and a fourth plurality of storage regions related to a third group is split based on another split command. For the purpose of this examination, the limitation will be interpreted as "And a relationship between the third plurality of storage regions and a fourth plurality of storage regions related to a second group is split based on another split command." Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. The snapshot command is made to a snapshot set. Therefore, it is inherent that the VSSC can issue a split command to the second group, thus splitting the relationship between the third plurality of storage regions and the fourth plurality of storage regions.

25. **Claim 23** is taught by Cabrera as:

t. Wherein the storage regions comprise a plurality of logical volumes. See column 7 lines 55-64.

26. **Claim 24** is taught by Cabrera as:

u. A storage system comprising a plurality of storage regions which include a consistency group having a first plurality of storage regions and a second plurality of storage regions. See figure 5, which shows multiple storage regions O1 to On, discussed in column 5 lines 55-57. See also column 2 lines 26-30, which show that when a write is made to an allocation unit that is part of a snapshot, the original data is copied to a differential file. The volumes that are part of the snapshot correspond to the first storage regions, and the differential files correspond to the second storage regions.

v. The consistency group being used to maintain consistency among data stored in the second plurality of storage regions. The snapshot sets described in column 9 lines 48-52 are equivalent to the consistency group.

w. A plurality of disk drive units having a plurality of disk drives which include the plurality of storage regions. Column 3 lines 47-49 show that the invention acts to coordinate/manage multiple different volume snapshot providers. In the context of the reference, this shows that multiple different storage devices, each containing one or more disk drives as known to one of ordinary skill in the art, can be used together and treated as a single storage and snapshot system. See column 3 lines 1-38 for an explanation.

x. A controller configured to be coupled to an information processing device and to transfer data sent from the information processing device to the plurality of storage regions. See the Volume Snapshot Service Coordinator described in column 4 lines 37-42. The VSSC provides a consistent API to allow a host computer to interface with a plurality of storage devices.

y. Wherein the controller is configured to receive a split command sent to the consistency group, the split command being used to split a relationship between the first plurality of storage regions and the second plurality of storage regions. The split command as taught by page 12 lines 12-27 of the instant application is equivalent to taking a snapshot in that the second volume will contain only the data present in the second volume at the time of the split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. Therefore, it is inherent that the VSSC is configured to receive the split command sent to the first group.

z. Start changing a split status in which a relationship between the first plurality of storage regions and the second plurality of storage regions is split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. This means that the storage regions in the group change from a first status, in which all writes to the first plurality are written to the second plurality, to a second status, in which no writes are made to the second plurality.

aa. Receive a write command sent from the information processing device to a first storage region of the first plurality of storage regions after starting to change to the split status. Kusters column 1 lines 61-64 shows that a snapshot with a differential file can be created without suspending writes. Therefore, it is inherent that the controller is configured to receive a write command while changing from the first status to the second.

bb. Be able to copy data stored in the first storage region to a second plurality of storage regions after receiving the write command. Kusters column 1 lines 22-30 shows that the snapshot system is a copy on write (see figure 6), which saves a snapshot as a point in time copy of the first volume.

cc. And write data related to the write command to the first storage region after being able to copy data. In a copy on write snapshot system, the new data will be written to the first volume after the data from the first volume is copied to the second volume, thus copy on write.

27. **Claim 25** is taught by Cabrera as:

dd. A storage system comprising a plurality of storage regions which include a consistency group having a first plurality of storage regions and a second plurality of storage regions, in which a consistency among data stored in the second plurality of storage regions is maintained, if a relationship between the first plurality of storage regions and the second plurality of storage regions is split. See figure 5, which shows multiple storage regions O1 to On, discussed in column 5 lines 55-57. See also column 2 lines 26-30, which show that when a write is made to an allocation unit that is part of a snapshot, the original data is copied to a differential file. The volumes that are part of the snapshot correspond to the first storage regions, and the differential files correspond to the second storage regions. The differential file is maintained as a point in time copy of the first volume.

ee. A plurality of disk drive units having a plurality of disk drives which include the plurality of storage regions. Column 3 lines 47-49 show that the invention acts to coordinate/manage multiple different volume snapshot providers. In the context of the reference, this shows that multiple different storage devices, each containing one or more disk drives as known to one of ordinary skill in the art, can be used together and treated as a single storage and snapshot system. See column 3 lines 1-38 for an explanation.

ff. And a controller configured to control transfer of data to the plurality of storage regions, wherein the controller is configured to receive a split command sent to the consistency group, the split command being used to split a relationship between the first plurality of storage regions and the second plurality of storage regions. The split command as taught by page 12 lines 12-27 of the instant application is equivalent to taking a snapshot in that the second volume will contain only the data present in the second volume at the time of the split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. Therefore, it is inherent that the VSSC is configured to receive the split command sent to the first group.

gg. Start changing to a split status in which a relationship between the first plurality of storage regions and the second plurality of storage regions is split.

Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. This means that the storage regions in the group change from a first status, in which all writes to the first plurality are written to the second plurality, to a second status, in which no writes are made to the second plurality.

hh. Receive a write command sent to a first storage region of the first plurality of storage regions after starting to change the split status. Kusters column 1 lines 61-64 shows that a snapshot with a differential file can be created without suspending writes. Therefore, it is inherent that the controller is configured to receive a write command while changing from the first status to the second.

ii. Be able to copy data stored in the first storage region to a second plurality of storage regions in accordance with the received write command. Kusters column 1 lines 22-30 shows that the snapshot system is a copy on write (see figure 6), which saves a snapshot as a point in time copy of the first volume.

jj. And write data related to the write command to the first storage region after being able to copy data. In a copy on write snapshot system, the new data will be written to the first volume after the data from the first volume is copied to the second volume, thus copy on write.

28. **Claim 26** is taught by Cabrera as:

kk. A storage system comprising a plurality of storage regions which include a consistency group in which a relationship between a first plurality of storage regions of the plurality of storage regions and a second plurality of storage regions related to the first plurality of storage regions is split based on a received split command. See figure 5, which shows multiple storage regions O1 to On, discussed in column 5 lines 55-57. See also column 2 lines 26-30, which show that when a write is made to an allocation unit that is part of a snapshot, the original data is copied to a differential file. The volumes that are part of the snapshot correspond to the first storage regions, and the differential files correspond to the second storage regions.

ll. The split command being used to split the relationship between the first plurality of storage regions and the second plurality of storage regions. The split command as taught by page 12 lines 12-27 of the instant application is equivalent to taking a snapshot in that the second volume will contain only the data present in the second volume at the time of the split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. Therefore, it is inherent that the VSSC is configured to receive the split command sent to the first group.

mm. A plurality of disk drive units having a plurality of disk drives which include the plurality of storage regions. Column 3 lines 47-49 show that the invention acts to coordinate/manage multiple different volume snapshot providers. In the context of the reference, this shows that multiple different storage devices, each containing one or more disk drives as known to one of ordinary skill in the art, can be used together and treated as a single storage and snapshot system. See column 3 lines 1-38 for an explanation.

nn. A controller configured to control transfer of data to the plurality of storage regions wherein the controller is configured to receive the split command sent to the consistency group. The split command as taught by page 12 lines 12-27 of the instant application is equivalent to taking a snapshot in that the second volume will contain only the data present in the second volume at the time of the split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. Therefore, it is inherent that the VSSC is configured to receive the split command sent to the first group.

oo. Start changing to a split status in which the relationship between the first plurality of storage regions and the second plurality of storage units is split. Column 9 lines 48-52 show that all the snapshots in the set relate to the same point in time. This means that the storage regions in the group change from a first status, in which all writes to the first plurality are written to the second plurality, to a second status, in which no writes are made to the second plurality.

pp. Receive a write command sent to a first storage region of the first plurality of storage regions after starting to change to the split status. . Kusters column 1 lines 61-64 shows that a snapshot with a differential file can be created without suspending writes. Therefore, it is inherent that the controller is configured to receive a write command while changing from the first status to the second.

qq. Copy data stored in the first storage region to a second storage region of the second plurality of storage regions in accordance with the received write command. Kusters column 1 lines 22-30 shows that the snapshot system is a copy on write (see figure 6), which saves a snapshot as a point in time copy of the first volume.

rr. Write data related to the write command to the first storage region after being able to copy data. In a copy on write snapshot system, the new data will be written to the first volume after the data from the first volume is copied to the second volume, thus copy on write.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared I. Rutz whose telephone number is (571) 272-5535. The examiner can normally be reached on M-F 8:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jared I Rutz

Examiner
Art Unit 2187

CPC/jir JIR

CHRISTIAN CHACE
PRIMARY EXAMINER